SeaTalk^{ng}

Reference Manual

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Raymarine®

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Preface

WARNING: Electrical safety

Make sure you have switched off the power supply before you start installing this product.

EMC conformance

All Raymarine equipment and accessories are designed to the best industry standards for use in the recreational marine environment.

The design and manufacture of Raymarine equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to ensure that performance is not compromised.

Product documents

This manual gives information on the Raymarine SeaTalk^{ng} system. It should be read in conjunction with the documents for the individual products that connect to SeaTalk^{ng}.

To the best of our knowledge, the information in this document was correct when it went to press. However, Raymarine cannot accept liability for any inaccuracies or omissions in product documents.

In addition, our policy of continuous product improvement may change specifications without notice. Therefore, Raymarine cannot accept liability for any differences between the product and the accompanying documents.

Product disposal

Waste Electrical and Electronic (WEEE) Directive

The WEEE Directive requires the recycling of waste electrical and electronic equipment.

Whilst the WEEE Directive does not apply to some of Raymarine's products, we support its policy and ask you to be aware of how to dispose of this product.

The crossed out wheelie bin symbol, illustrated above, and found on our products signifies that this product should not be disposed of in general waste or landfill.

Please contact your local dealer, national distributor or Raymarine Technical Services for information on product disposal.

Chapter 1: Description

1.1 SeaTalk^{ng} overview

Introduction

SeaTalk^{ng} is an interconnection bus for Raymarine products, and comprises a main backbone to which Raymarine products are connected via spur cables (see *Figure 1-1*).

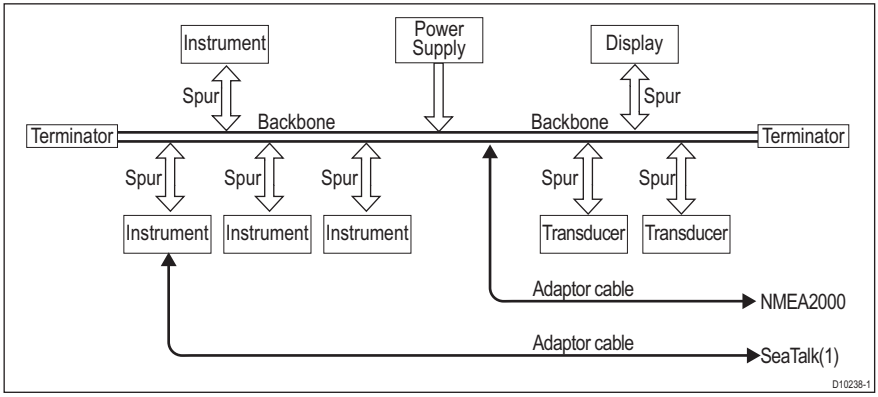


Figure 1-1 SeaTalk^{ng} overview

Terminology

Raymarine produces SeaTalk, SeaTalk^{2} and SeaTalk^{ng} proprietary bus systems. In this book, in the interests of clarity, SeaTalk is referred to as 'SeaTalk(1)'.

Connectability

Specific Raymarine products (e.g. ST70 instruments) perform a bridging function, to enable you to connect SeaTalk^{ng} to SeaTalk(1) products via appropriate adaptor cables. Adaptor cables are also available to connect NMEA2000 products.

1.2 Hardware

SeaTalk^{ng} comprises a single backbone terminated with two terminators, one at each end. Spur cables connect the backbone to individual SeaTalk^{ng} products.

Small diameter cable connectors are used throughout the system, to make installation easier. Cables and connectors are color-coded to reduce the likelihood of misconnection.

A wide range of different cable lengths provides flexibility and obviates the need for cutting and splicing cables.

Three-way, five- way and in-line connection pieces are available to connect cables, to deploy SeaTalk^{ng} as required.

Color coding

Cables and connectors are color-coded to facilitate correct connection. The color codes are:

- Backbone is blue.
- Spurs are white.

A power cable is also provided and is color-coded with a red strip.

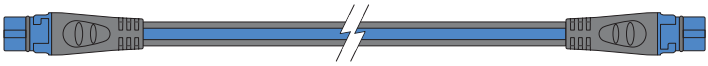
Important: you must fit Terminators

In order to ensure correct data transmission through a SeaTalk[ng] system**, a Terminator is required at each end of the backbone cable run.** Dedicated Terminators are available for this purpose. **Do NOT attempt to run a system that is not correctly terminated.**

Available parts

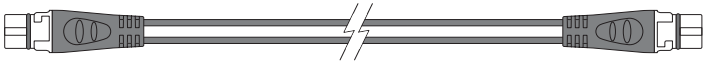
The following parts are available:

Backbone cable



Part numbers: 1 ft 3 in (400 mm) - A06033
3 ft 3 in (1 m) - A06034
9 ft 10 in (3 m) - A06035
16 ft 4 in (5 m) - A06036
65 ft 7 in(20 m) - A06037

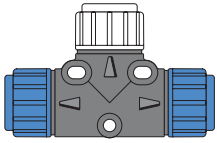
Spur cable



Part numbers: 1 ft 3 in (400 mm) - A06038,
3 ft 3 in (1 m) - A06039
9 ft 10 in (3 m) - A06040
16 ft 4 in (5 m) - A06041

T-Piece

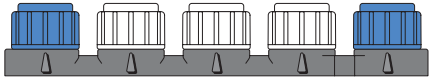
Connects spur to backbone.



Part number: A06028

5-Way Connector

Connects spurs to backbone



Part number: A06064

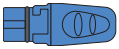
Backbone Extender

Connects two backbone cables

Part number: A06030

Terminator

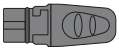
Fitted at each end of backbone



Part number: A06031

Blanking Plug

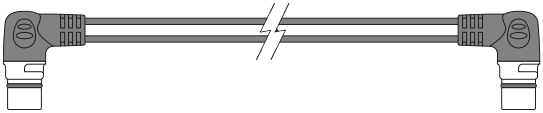
Inserted into unused spur connector positions in 5-way connector & T Piece



Part number: A06032

Elbow Spur cable (1 ft 3 in (400 mm))

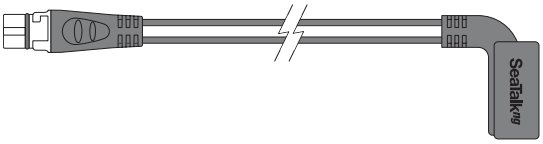
For spurs in confined spaces



Part number: A06042

SPX Spur cable

Connects SeaTalk^{ng} to Raymarine SPX Course Computers



Part number: To be announced

Power cable

Connects SeaTalk^{ng} 12 V dc supply

Part number: A06049

Stripped End Spur cable

Connects products which do not have plug-in connectors (e.g. transducer pods)

Part numbers: 1 m - A06043, 3 m - A06044

SeaTalk Adaptor cable

Connects SeaTalk^{ng} products to SeaTalk(1)

Part number: A06047

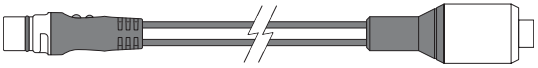
SeaTalk^2 adaptor cable

Connects SeaTalk^{ng} products to SeaTalk^2

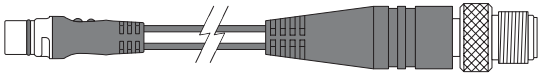
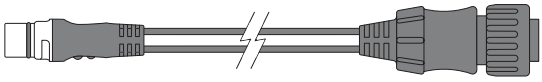
Part number: A06048

DeviceNet female adaptor cable

Connects SeaTalk^{ng} products to NMEA2000



Part number: A06045

DeviceNet male adaptor cable Connects SeaTalk^{ng} products to NMEA2000	 Part number: A06046
E-Series Adaptor cable Connects SeaTalk^{ng} products to Raymarine E-Series Displays	 Part number: A06061
SeaTalk^{ng} Reference Manual	Part number: 81300-1
Backbone Kit	Part number: A25062 Comprises: Two terminators One 65 ft 7 in (20 m) Backbone cable Two 16 ft 4 in (5 m) Backbone cables Four T Piece connectors One Power Cable One SeaTalk^{ng} Reference Manual (this book)

Other cables

In addition to the parts listed, a range of connector cables is available from your Raymarine dealer to connect to other Raymarine products and systems.

Connectors

SeaTalk^{ng} connectors are lockable to ensure reliable, secure connectivity. Keyways on the connectors ensure correct orientation. Locking collars on the SeaTalk^{ng} T-Piece, 5-Way Connector and Backbone Extender rotate to lock the connections. Molded arrow indicators on the connectors align to show when the connector is unlocked.

1.3 Using SeaTalk^{ng}

A complete SeaTalk^{ng} backbone comprises two or more backbone cables connected in series. There must be only one backbone and this must be terminated with two terminators, one at each end of the backbone. Do NOT connect a terminator to any spur.

In a SeaTalk^{ng} system and any system to which it is connected:

- As a general rule, there must only be one data source (transducer) for each data type. Although some products may be permitted as secondary data sources, do not duplicate the source for any data unless permission is specifically given in the relevant product documents.
- There must be only one power source.

It is particularly important to be aware of these requirements when connecting to another system. For example, in Raymarine SeaTalk(1), power is often supplied from the system autopilot.

You can use SeaTalk^{ng}:

- As a self-contained system in which only products fitted with SeaTalk^{ng} connectors are connected via spur cables to the SeaTalk^{ng} backbone.
- As an extended system, connected to SeaTalk(1) products via an adaptor cable.

You must NOT connect a SeaTalk^{ng} system to a SeaTalk^{2} system.

You may connect specific SeaTalk^{ng} products (e.g. ST70 instruments) to existing SeaTalk(1) and SeaTalk^{2} systems, using the appropriate adaptor cables. Refer to the instructions with these products for details of how to connect them.

As it is obviously not possible to describe all possible configurations for SeaTalk^{ng}, general guidelines, are given here.

Typical applications

A typical SeaTalk^{ng} system is shown in *Figure 1-2*. It comprises the main backbone, with compatible products connected via spur cables.

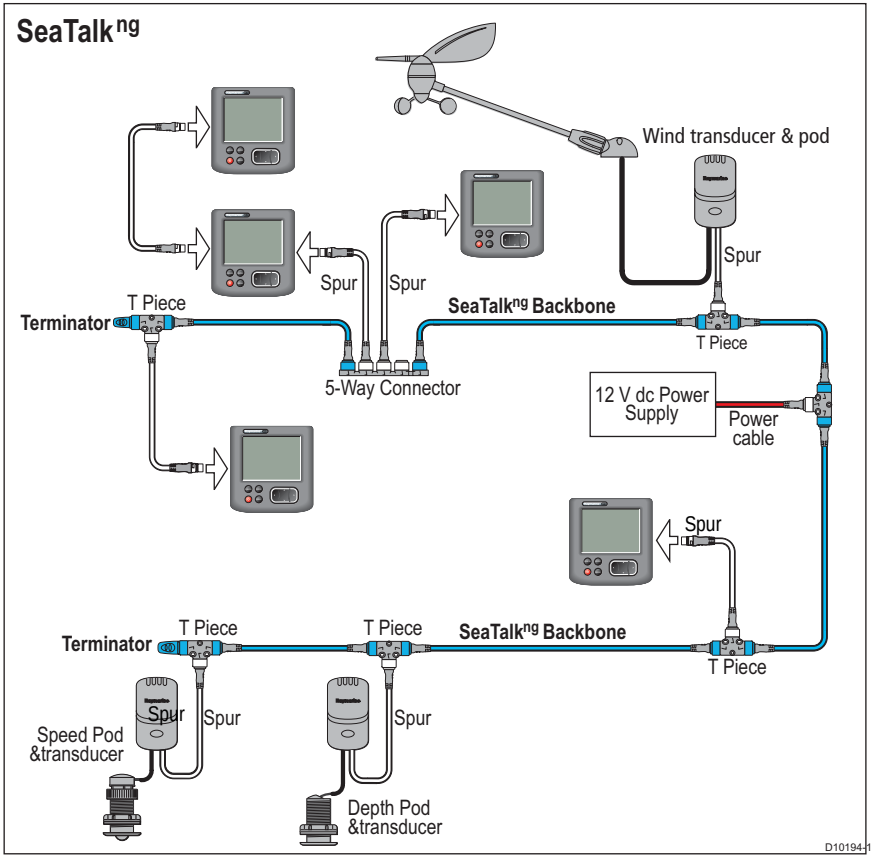


Figure 1-2 Typical basic SeaTalk^{ng} system

General guidelines when using with other systems

Basic rules

If SeaTalk^{ng} is connected to any other system, ensure that in the combined system:

- You connect only one source for any data type, unless permission is specifically given in the relevant product documents.
- You connect only one power source.

Limitations when SeaTalk(1) products are connected

If SeaTalk^{ng} and SeaTalk(1) products are used together, do NOT connect an NMEA2000 backbone, as this product combination could compromise the integrity of the NMEA2000 system.

Using with SeaTalk(1)

Provided you do not want to connect to NMEA2000, you can connect a SeaTalk^{ng} system to SeaTalk(1) using a suitable SeaTalk^{ng} bridging product (such as an ST70 instrument) and adaptor cables to connect the two systems.

If you intend doing this, note that:

- You can connect a single SeaTalk(1) network to SeaTalk^{ng} using an adaptor cable and one bridging product (e.g. ST70 instrument).
- You can connect two separate SeaTalk(1) networks to SeaTalk^{ng} using different adaptor cables and bridging products (e.g. ST70 instruments), but the two SeaTalk(1) networks must NOT be connected together.

Summaries of acceptable and unacceptable SeaTalk^{ng}/SeaTalk(1) scenarios are shown in *Figure 1-3* and *Figure 1-4* respectively.

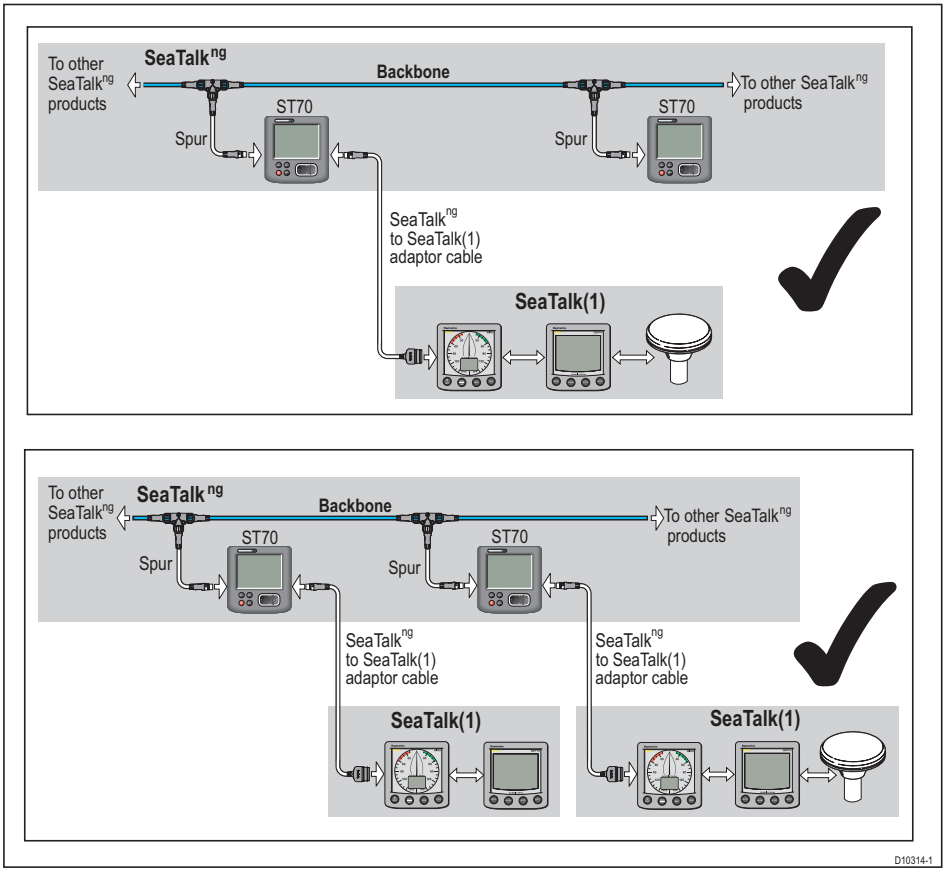


Figure 1-3 SeaTalk^{ng}/SeaTalk(1) acceptable scenarios

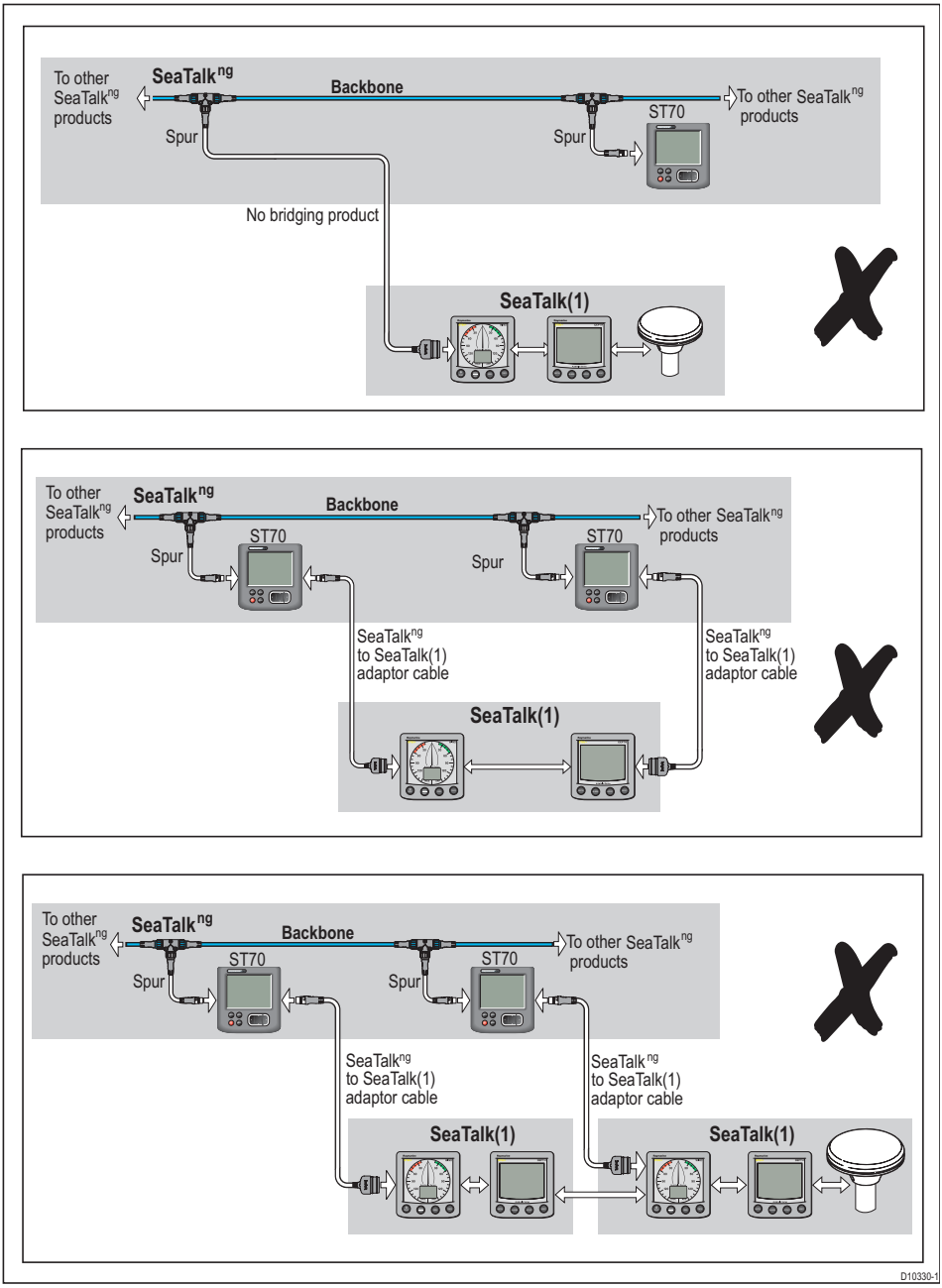


Figure 1-4 SeaTalkng/SeaTalk(1) unacceptable scenarios

Chapter 2: Installation

2.1 Preparation for installation

EMC installation guidelines

Raymarine equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) regulations. This minimizes electromagnetic interference between equipment, which could otherwise affect the performance of your system.

Correct installation is required to ensure that EMC performance is not compromised.

For optimum EMC performance, we recommend that:

- Raymarine equipment and the cables connected to it are:
  - At least 3 ft (1 m) from any equipment transmitting or cables carrying radio signals e.g. VHF radios, cables and antennas. In the case of SSB radios, the distance should be increased to 7 ft (2 m).
  - More than 7 ft (2 m) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- Raymarine specified cables are used.
- Cables are not cut or extended unless doing so is detailed in the installation manual.

Remember

Where constraints on the installation prevent any of the above recommendations, always allow the maximum separation possible between different items of electrical equipment.

This will provide the best conditions for EMC performance for the installation.

Suppression ferrites

Raymarine cables may be fitted with suppression ferrites. These are important for correct EMC performance. Any ferrite removed to facilitate installation must be replaced in the original position immediately installation is complete.

Use only ferrites of the correct type, supplied by Raymarine authorized dealers.

Connections to non-Raymarine equipment

If Raymarine equipment is to be connected to other equipment using a cable not supplied by Raymarine, a Raymarine suppression ferrite MUST always be attached to the cable near the Raymarine unit.

Tools required

Before installing SeaTalk^{ng}, ensure you have the appropriate tools. In most cases, a typical fitter's toolkit should suffice, provided it has tools to enable you to:

- Drill holes for cable runs.
- Connect prepared bare wire ends to terminal blocks.

System structures

Plan the route of the SeaTalkng backbone so that it runs as close as is practicable to the intended location of each SeaTalkng product, to keep spur lengths to a minimum.

Products connect to the backbone via spur cables. Spurs connect to the backbone via either a SeaTalkng T-Piece or a SeaTalkng 5-Way Connector.

Power supply considerations

It is important that power for SeaTalkng is provided from only one power source. If you intend using your SeaTalkng system with any other system (e.g. SeaTalk(1)), power may already be connected to the other system. If this is the case, do NOT connect an additional power source to SeaTalkng.

Product loading

The number of products you can connect to a SeaTalkng system depends on the power each product consumes and on the physical length of the proposed system. Each Raymarine product has a Load Equivalency Number (LEN), which indicates how much power it consumes.

Power sources

A SeaTalkng system requires one 12 V dc supply, connected to the SeaTalkng backbone. This can be provided:

- By a battery.
- From a Raymarine Course Computer, via SeaTalk and/or SeaTalkng.

Note: *If a battery is used as a power source, it is recommended that in order to avoid sudden voltage drops, the battery used for engine starting is NOT used to power SeaTalkng.*

On boats with 24 V dc systems, a suitable 24 V to 12 V dc dropper may be used. Check with Raymarine Customer Support or your Dealer for suitability.

Protection

The power source must be protected by a 5 A fuse or a circuit breaker providing equivalent protection.

Power connection point

Balanced system

We recommend that as a general rule, power is connected to a SeaTalkng system in such a way that the current drawn on each side of the power connection point, is equal.

This is termed a balanced system.

Figure 2-1, shows a theoretical balanced system. In this system the total LEN of the all products is 40, so the optimum power connection point is a total LEN value of 20 each end of the backbone.

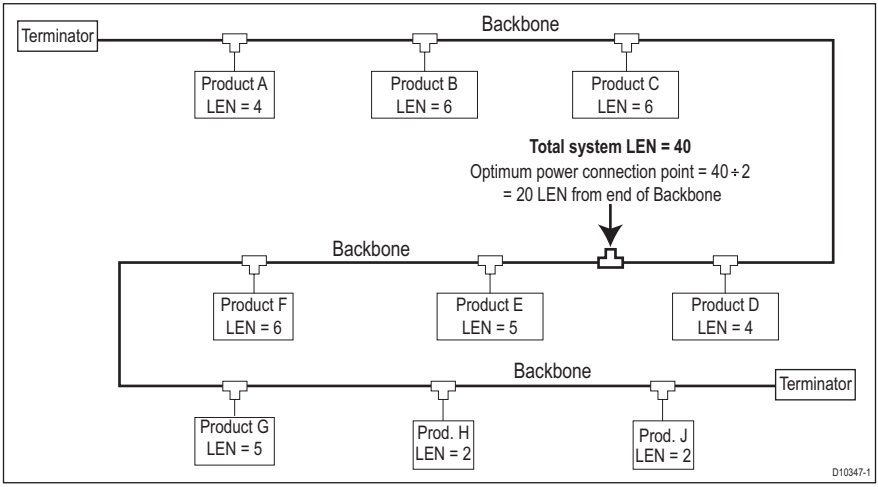


Figure 2-1 Where to connect SeaTalk^{ng} power in a balanced system

Small systems

Although the preferred method of connection is to form a balanced system as above, in systems where the backbone length is 60 m or less, you may connect power at one end of the system, to form an unbalanced system.

Permitted power loading

The total load permissible in a SeaTalk^{ng} system is defined in terms of the total LEN of all products connected to the system, and depends on the length of the backbone.

Balanced system loading

The maximum loading (total LEN) for balanced SeaTalk^{ng} systems of various lengths is given in the following table. **Note that in each case, the total LEN must be divided equally each side of the power connection point.**

Backbone length	Total LEN
197 ft (60 m) or less	100
262 ft (80 m)	84
328 ft (100 m)	60

Backbone length	Total LEN
394 ft (120 m)	50
459 to 525 ft (140 to 160 m)	40
591 to 656 ft (180 to 200 m)	32

Unbalanced system loading

The maximum LEN for unbalanced SeaTalk^{ng} systems up to 197 ft (60 m) is given in the following table.

Backbone length	Total LEN
66 ft (20 m)	40
131 ft (40 m	20
197 ft (60 m)	14

System limitations

In a SeaTalkng system:

- The total length of backbone cable between the two Terminators must not exceed 656 ft (200 m).
- The length of any individual spur must not exceed 16 ft 4 in (5 m).
- The total length of all spurs must not exceed 98 ft 5 in (30) m. So for example, your system could have 30 spurs, each of 3 ft 3 in (1 m), or 6 spurs each of 16 ft 4 in (5 m).
- The total LEN in the system must not exceed the value detailed under *Permitted power loading*.

Cabling

When planning SeaTalkng cable routes (see *Figure 2-2* and *Figure 2-3*), ensure that the EMC conditions are fulfilled (see *EMC installation guidelines* above*)*. In particular, do not route cables near fluorescent lights, engines and radio transmitting equipment, as these may cause interference. Taking this into account, plan the backbone route to run as close as possible to the intended locations of the products to be connected.

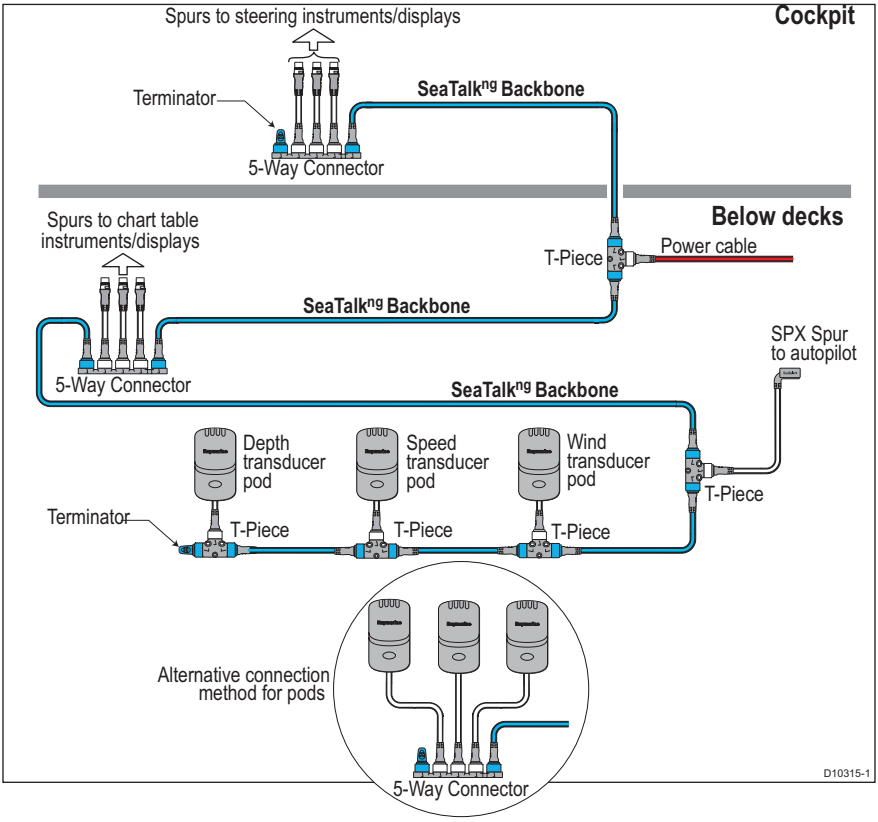


Figure 2-2 Typical SeaTalkng cabling

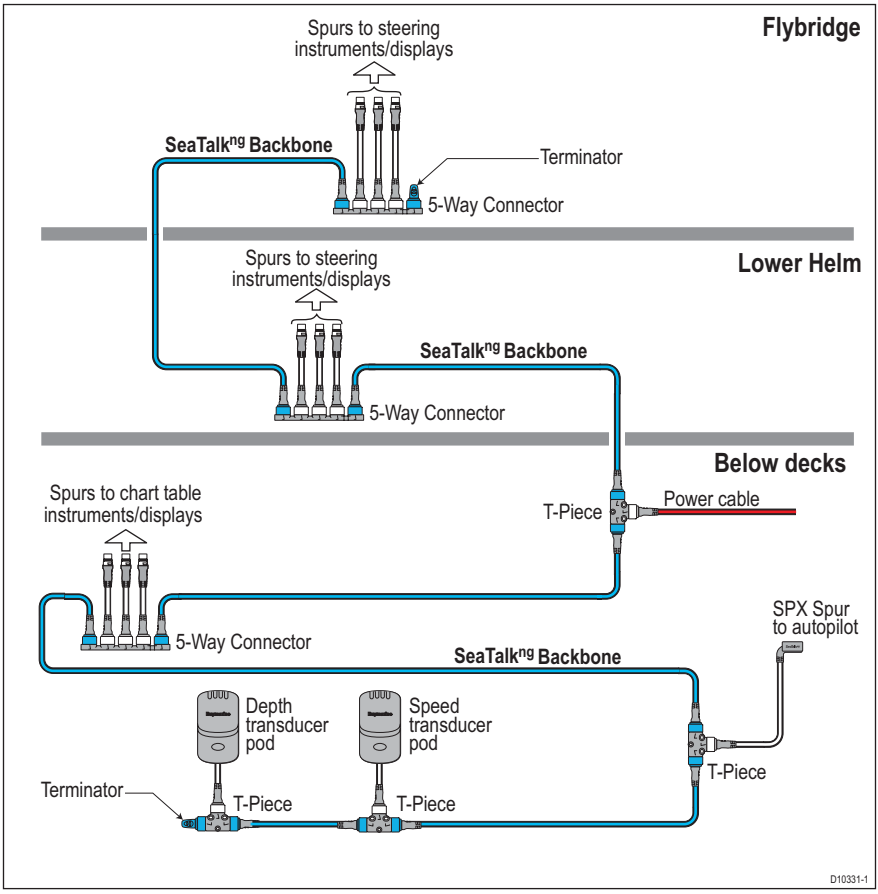


Figure 2-3 Typical SeaTalk^{ng} cabling on flybridge vessel

2.2 Procedures

General requirements

Use only the appropriate lengths of genuine Raymarine SeaTalk^{ng} made-up backbone and spur cables. Do NOT cut or otherwise modify the cables.

To minimize the need to coil and stow spare cable, always use lengths of cable appropriate to the cable run lengths.

Making connections

Make each SeaTalk^ng connection as demonstrated in *Figure 2-4* .

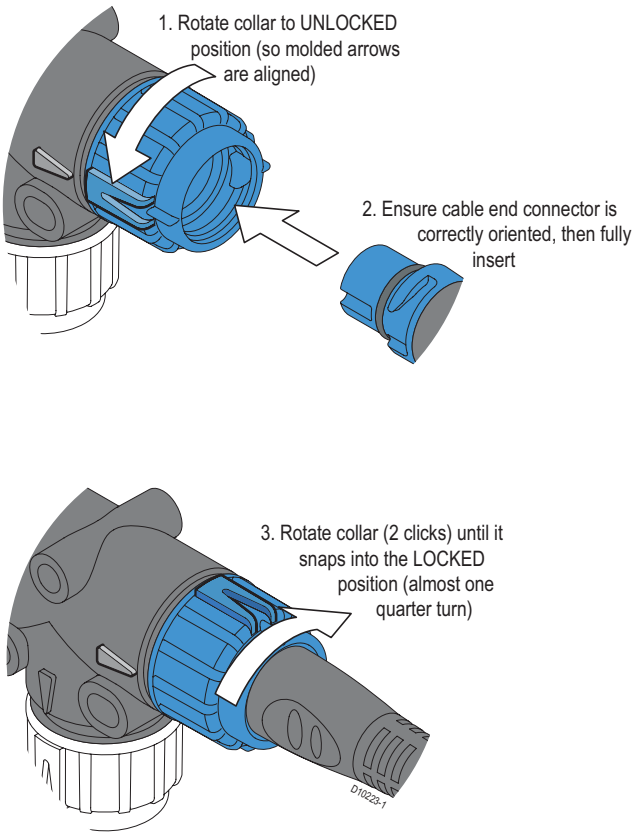

1. Rotate collar to UNLOCKED position (so molded arrows are aligned)
2. Ensure cable end connector is correctly oriented, then fully insert
3. Rotate collar (2 clicks) until it snaps into the LOCKED position (almost one quarter turn)
D10223-1

Figure 2-4 Connecting cables

Running cables

When running SeaTalk^ng cables, always do so in accordance with the following guidelines:

- Do not run cables where they are likely to be easily damaged.
- If a cable has to be fed through the deck, always use a proprietary deck gland.
- Where cables are fed through holes (in bulkheads etc), always use the appropriate grommets to prevent chafing.
- Secure long cable runs so they do not present a hazard.
- Do not position cable connectors in bilges.

Installing Backbone

Build the backbone by running backbone cables between the locations of the products you want to connect (spur points). At each spur point, connect the backbone cables to an appropriate SeaTalk^{ng} connecting device, either:

- T-Piece, part number A06028. Use where you want to connect a spur cable to just one product.
- 5-Way Connector, part number A06064. Use where you want to connect more than one spur cable to products fitted close to one another (e.g. in the cockpit).
- Backbone Extender, part number A06030. Use as necessary, to connect lengths of backbone cable together.

CAUTION: Backbone Extender

The Backbone Extender A06030 is suitable only for connecting backbone cables. Do NOT attempt to use it to join spur cables, or damage could occur.

Connecting spurs

At each connecting device (T-Piece or 5-Way Connector), connect spur cables to the white connectors as required, then run each spur cable to the location of the product to be connected. Connect each spur cable to the relevant product in accordance with the installation instructions for the product.

Where space is limited, e.g. behind instrument consoles, it may be easier to use an elbow spur cable rather than the conventional straight spur.

Connecting power

This section describes how to connect power to a stand-alone SeaTalk^{ng} system. If your SeaTalk^{ng} system is connected to any other system (e.g. another SeaTalk system) and the other system already has its own power source, do NOT connect another power source to SeaTalk^{ng}.

CAUTION: Do not connect power until installation is complete

Before connecting a power cable to the SeaTalk^{ng} backbone, ensure it is not connected to a power source.

For optimum SeaTalk^{ng} performance, power must be connected in accordance with the conditions described under *Power supply considerations* on *page 10*. Whenever possible, connect your system as a balanced system.If it is not possible to do this and the SeaTalk^{ng} backbone is less than 197 ft (60 m) in length, you may connect the power source to form an unbalanced system.

Ensure that the power source is protected by a 5 A fuse or a circuit breaker providing equivalent protection.

Balanced system

To connect power for a balanced SeaTalk^{ng} system:

1. Determine the total LEN of the products in the system.
2. Divide the total LEN by two and note the value.

3. Starting at one end of the system, add the LEN of each product in turn, until you reach the value calculated at step 2. The point on the backbone between this product and the next is the point where the system load is evenly split.
4. At this point fit a T-Piece A06028 then Connect a SeaTalkng Power Cable A06049 to the white connector on the T-Piece. See *Figure 2-5*.
5. Ensure the power supply is switched off then connect the power cable via a 5 A fuse or equivalent value circuit breaker, to the power supply.

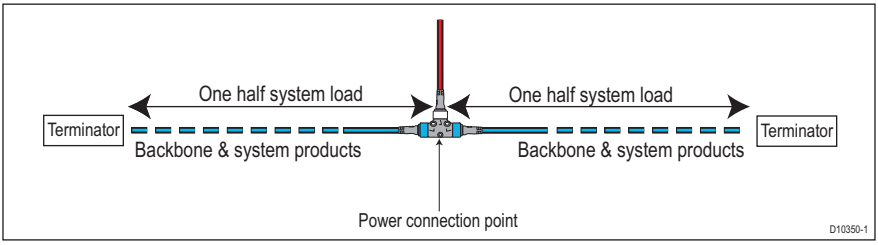
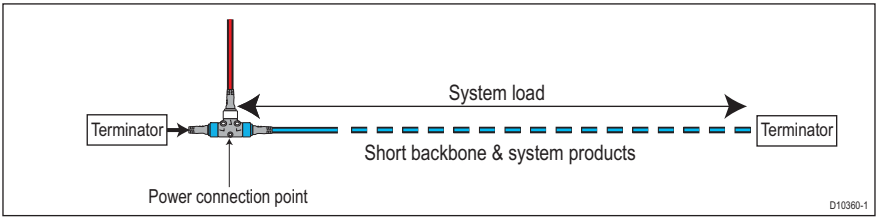


Figure 2-5 Connecting power to a balanced system

Unbalanced system

If the backbone is less than 197 ft (60 m), you can connect your power source to form an unbalanced system, as follows:

1. At one end of the backbone fit a T-Piece A06028 then connect a SeaTalkng Power Cable A06049 to the white connector on the T-Piece.
2. Ensure the power supply is switched off then connect the power cable via a 5 A fuse or equivalent value circuit breaker, to the power supply.



Fitting Terminators

When the backbone is in position, use a suitable connecting device (e.g. a T-Piece) to connect a SeaTalkng Terminator at each end of the backbone. Secure the Terminator by locking it, in the same way as for the SeaTalkng connectors.

Fitting Blanking Plugs

When all cables have been run and connected, fit a SeaTalkng Blanking Plug to each unused spur connector on SeaTalkng 5-Way Connectors and T-Pieces. Secure each blanking plug by locking it, in the same way as for SeaTalkng connectors.

Chapter 3: Post installation procedures

3.1 Checks

When the backbone has been fitted and the spur cables connected, carry out the following checks before applying power:

- Ensure that SeaTalk^{ng} is powered from just ONE 12 V source.If SeaTalk^{ng} is connected to any other SeaTalk system, make sure this system does not have its own separate power source.
- Ensure all backbone connectors are secure.
- Ensure all products are securely connected to their respective spur cables.
- Ensure Terminators are securely fitted at each end of the backbone.

3.2 Maintenance

Periodically check that:

- System connections are secure.
- The cables for signs of chafing and other damage. Replace as necessary.

3.3 Troubleshooting

If SeaTalk^{ng} appears not to be operating as it should, first check for error messages on any of the products connected to the system. If this does not resolve the problem, ensure that:

- All products in the system are fully serviceable.
- All system connections are secure.
- All cables are in good condition and that there are no breaks or other damage.
- SeaTalk^{ng} is configured correctly, as described in *Chapter 2*. In particular, check that:
  - There is only one backbone, terminated with just two terminators, i.e. one at each end of the backbone.
  - Terminators are NOT fitted to any spur.

Technical support

Raymarine provides a comprehensive customer support service, on the world wide web and by telephone help line. Please use either of these facilities if you are unable to rectify a problem.

World wide web

Please visit the Customer Support area of our web site at:

www.raymarine.com

As well as providing a comprehensive Frequently Asked Questions section and servicing information, the web site gives e-mail access to the Raymarine Technical Support Department and a details of the locations of Raymarine agents, worldwide.

Telephone help line

If you do not have access to the world wide web, please call our help line.

In the USA, call:

- +1 603 881 5200 extension 2444

In the UK, Europe the Middle East or the Far East, call:

- +44 (0) 23 9271 4713 (voice)
- +44 (0) 23 9266 1228 (fax)

Help us to help you

When requesting service, please quote as much of the following product information for the products connected to SeaTalk^{ng}:

- Product type.
- Model number.
- Serial number.
- Software issue number.

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